

Applicant/Serial No.: Nicholas F. D'Antonio et al. / 10/730,147
Filed/Conf. No. 12/8/2003 / Conf. No. 2308
Examiner/Group: Timothy Lewis Maust / 3751
Response to Restriction Requirement mailed: 09 / 08 / 2005
Attorney File: DA0589US (#90036)

AMENDMENTS TO THE CLAIMS

1. (currently amended) Apparatus for filling at least one fluid cartridge with a fluid, the fluid cartridges having ~~a container with~~ a wall and an entrance orifice, said apparatus comprising:

a housing for receiving a container holding the fluid, the container having a fluid discharge orifice covered by a septum; and

a septum opening device affixed to said housing and independent of the fluid cartridge(s) for severing the septum in response to the relative movement of the container with respect to said septum opening device.

2. (currently amended) Apparatus according to claim 1 and further comprising:

an optional metering station for receiving an amount of fluid from the container for transfer to a fluid cartridge.

3. (currently amended) Apparatus according to claim 2 and further comprising:

a valve for opening for transmitting a predetermined amount of fluid to a fluid cartridge, and for closing when transmission is completed.

4. (original) Apparatus according to claim 2 and further comprising a conduit for defining a path for fluid from the container to said metering station, and a conduit defining a path for atmospheric air to the container, said conduits defining the respective paths in response to the severing of the septum on the container.

5. (currently amended) Apparatus according to claim 2 wherein said metering station is compressible for discharging the fluid received from the container for transfer to a fluid cartridge.

6. (original) Apparatus according to claim 1 wherein said housing further comprises a container support for supporting a container in an inverted position with the septum-covered discharge orifice facing downward, and wherein said septum opening device comprises a piercing member for piercing the septum in response to placing a container on said container support.

7. (original) Apparatus according to claim 4 and further including a fluid conduit for entering a container supported in said housing, said fluid conduit including a one-way valve for releasing fluid from the container to said metering station.

8. (original) Apparatus according to claim 4 and further including an air conduit for transferring air to the container, and a one-way valve for admitting air to the container.

9. (currently amended) Apparatus according to claim 2 wherein said housing comprises a container support for supporting a container in an inverted position with the septum covered discharge orifice facing downward, and wherein said metering station comprises:

a chamber defined by first walls fixed with respect to said housing, and

second walls, said first and second walls being movable with respect to each other to compress said chamber and force fluid from said chamber into a fluid cartridge.

10. (currently amended) Apparatus according to claim 9 wherein the fluid cartridge is covered with an openable cover, and wherein said second walls include a cover opening portion for opening the openable cover over the orifice of a fluid cartridge for defining a sterile procedure for fluid access to the fluid cartridge before, during and after filling.

11. (original) Apparatus according to claim 9 wherein said first and second walls have an open position for defining said chamber to form a relatively large cavity and a closed position for defining said chamber to form a relatively small cavity, and wherein said apparatus further includes a spring structure for biasing said first and second walls to the open position.

12. (currently amended) Apparatus according to claim 11 wherein said apparatus includes a fluid cartridge receiver, said fluid cartridge receiver comprising:

said second walls for cooperating with said first walls to define said chamber; and
channel walls defining a channel for providing a fluid path delivering fluid from said metering station to a fluid cartridge.

13. (currently amended) Apparatus according to claim 12 wherein said fluid cartridge receiver further includes a one-way valve in said channel for preventing the flow of fluid from said metering station where there is no fluid cartridge to receive the fluid.

14. (currently amended) Apparatus according to claim 1, wherein each fluid cartridge includes a piston inside the fluid cartridge for defining a fluid container between the piston and the fluid cartridge orifice, the piston moving away from the orifice as fluid enters the container, said apparatus further including:

a protrusion for receiving the outer surface of the fluid cartridge piston for determining the maximum amount of fluid for reception by the fluid cartridge.

15. (currently amended) Apparatus for filling at least one fluid cartridge with fluid, the fluid cartridge having an orifice at one end, said apparatus comprising:

a housing for receiving a container holding the fluid, the container having a rim defining a discharge orifice and a septum over the orifice, said housing comprising:

a container holding portion for holding a container in an inverted position with the septum covered orifice facing downwardly;

a container support for supporting the container rim and the container, said container support having a bored spike independent of the fluid cartridge(s) for piercing the septum, said bored spike having both a fluid conduit for discharging fluid from the container with a one-way valve for preventing leakage through the fluid conduit, and an air conduit for the flow of atmospheric air into the container with a one-way valve for preventing the flow of fluid or air through said air conduit out of the container; and

a neck portion forming part of a collapsible chamber of a metering station.

16. (currently amended) Apparatus according to claim 15 and further comprising:

a fluid cartridge receiver fixed relative to said housing, said fluid cartridge receiver comprising:

metering structure for cooperating with said neck portion of said housing to form the collapsible chamber of said metering station;

a tubular member extending from said metering station for defining a fluid flow path from said metering station to a fluid cartridge, with a one-way valve in said tubular member to prevent leakage of fluid from said tubular member when no fluid cartridge is present in said receiver.

17. (currently amended) Apparatus according to claim 16 and further comprising:

a biasing device for biasing said housing away from a fluid cartridge to enlarge the size of the chamber of said metering station.

18. (currently amended) Apparatus according to claim 17 and further comprising:

a platform for supporting at least one fluid cartridge to be filled, said platform having at least one protrusion for extending into the end of a fluid cartridge opposite the orifice end of the fluid cartridge for establishing the maximum content of the fluid cartridge.

19. (currently amended) Apparatus according to claim 18 and further comprising:

an interface device for interfacing a fluid cartridge with said apparatus, wherein said tubular member extends between said metering station and said interface device for defining the fluid flow path from said metering station to the fluid cartridge.

20. (currently amended) Apparatus according to claim 19 wherein the orifice of the at least one fluid cartridge is covered with an openable flexible sheet, said apparatus further comprising:

an orifice sheet opener for opening the sheet covering the orifice of the fluid cartridge to provide access to the orifice of the fluid cartridge;

wherein when a fluid cartridge is disposed in said interface device and force is applied to said housing to cause the orifice sheet opener to open the sheet covering the orifice of the fluid cartridge and to decrease the size of said metering station, to force fluid from said metering station, through said tubular member, through the opened sheet cover of the fluid cartridge and into the fluid cartridge, fluid being discharged from the container through said container conduit and air being admitted to the container through said air conduit, said housing being thereafter moved to enlarge the size of the chamber of said metering station upon the filling of the fluid cartridge with the fluid.

21. (currently amended) Apparatus for directing fluid discharged from a container and for holding a fluid cartridge to receive the discharged fluid, said apparatus cooperating with structures forming one portion of a metering station having a variable size chamber for holding fluid from the container prior to the transfer of the fluid to the fluid cartridge, said apparatus comprising:

an interface device comprising:

a second portion of the station for cooperating with the one portion of the metering station;

a receiver end for receiving a fluid cartridge to be filled with fluid;

a tubular member extending between the metering station and said receiver end for defining a fluid flow path from the metering station to a received fluid cartridge, with a one-way valve in said tubular member to prevent leakage of fluid from said tubular member when no fluid cartridge is present in said receiver; and

a biasing device interconnecting said interface device and the one portion for biasing the one portion away from said interface device to enlarge the size of the chamber of the metering station.

22. (currently amended) Apparatus according to claim 21 wherein the fluid cartridge orifice is covered with an openable flexible sheet, and has a wall defining an interior of the fluid cartridge, an opening at the end opposite the orifice and a movable piston disposed in the interior of the fluid cartridge and being movable away from the fluid cartridge orifice as the fluid cartridge is being filled, the final amount the piston can be moved away from the orifice determining the total amount of fluid admissible into the fluid cartridge, said apparatus further comprising:

a platform for supporting the fluid cartridge to be filled, said platform having a protrusion for extending into the end of a fluid cartridge opposite the orifice end of the fluid cartridge for establishing the maximum content of the fluid cartridge.

23. (currently amended) A system for filling fluid cartridges with fluid from a container, the container having an interior and a fluid discharge outlet, the container discharging fluid through the discharge outlet in response to an air pressure differential across the fluid, said system comprising:

a holder for holding the container;

an air pressure differential apparatus for creating an air pressure differential across fluid in the container, said air pressure differential apparatus comprising:

walls defining a variable size chamber operatively connected to the container, said walls being movable to expand said chamber from a decreased size to create an air pressure differential across fluid in the container to draw fluid from the container, and said walls being movable to decrease the size of said chamber from an expanded size for forcing fluid withdrawn from the container into a cartridge and for equalizing the air pressure across fluid in the container.

24. (currently amended) A system according to claim 23 and further comprising:

a container holder wall structure connected to said holder and including chamber surfaces; and

an interface device for receiving a fluid cartridge and for transferring fluid withdrawn from the container into the fluid cartridge;

wherein said walls defining a variable size chamber include said chamber surfaces of said container holder wall structure for defining one portion of said variable size chamber.

25. (currently amended) A system according to claim 24 wherein said interface device has interface surfaces for defining a second portion of said variable size chamber,

said container holder wall structure and said interface device being movable in a first direction apart from each other to expand the size of said variable chamber to draw fluid into said chamber and admit air into the container to equalize the pressure across the fluid in the container, and being movable in a second direction towards each other to decrease the size of said variable chamber to force fluid from said chamber to said interface device and thereafter to a fluid cartridge.

26. (currently amended) A system according to claim 25 wherein said interface device comprises:

a receptacle for receiving a container said holder wall structure to define said variable size chamber; and

a conduit for transferring fluid from said chamber to a fluid cartridge.

27. (currently amended) A system according to claim 26 wherein said holder and said container holder wall structure are movable in response to force applied to said holder, said receptacle receiving said container holder wall structure includes structure for receiving a fluid cartridge in position to receive fluid from said conduit.

28. (previously presented) A system according to claim 27 and further includes a biasing device for urging said container holder wall structure in the first direction to increase the size of said variable chamber.

29. (currently amended) A system according to claim 26 wherein said variable size chamber in the expanded size is able to hold at least enough fluid to fill a fluid cartridge, and said variable size chamber discharging sufficient fluid to fill a fluid cartridge received in said structure in response to the changing of said chamber from the expanded size to the decreased size.

30. (previously presented) A system according to claim 23 wherein the container has a discharge orifice and a septum closing the orifice to hold fluid in the container, and said holder includes a piercing instrument for piercing the septum, and wherein said pressure differential apparatus comprises:

a fluid transfer channel for transferring fluid from the container to said variable size chamber; and

an air transfer channel for transferring air to the container as fluid is withdrawn from the container, in response to the piercing of the septum by said piercing instrument.

31. (previously presented) A system according to claim 30 wherein said instrument for piercing the septum is a spike, said fluid transfer channel extends through said spike interconnecting the containers and said chamber, and said air transfer channel extends through said spike interconnecting the container and the atmosphere.

32. (previously presented) A system according to claim 31 and further including a one-way valve for enabling air to enter the container and for preventing air and fluid from leaving the container.

33. (previously presented) A system according to claim 31 wherein said holder for holding the container receives the container in an inverted position with the septum facing downwardly towards the earth.

34. (currently amended) A system according to claim 29 wherein said interface includes:
a wall structure receptacle for receiving said container holder wall structure;

a chamber body forming one of said walls defining part of said variable size chamber, said chamber body including a fluid conduit for transferring fluid from said variable size chamber to a fluid cartridge held in said fluid cartridge holding structure;
and

a spring structure in said wall structure receptacle for urging said container holder wall structure out of said receptacle to urge said variable size chamber to the expanded size;

said holder and said container holder wall structure moving into said wall structure receptacle and said wall structure with said chamber body decreasing the size of said variable

size chamber in response to force being applied to move said holder towards said interface, to transfer fluid from said variable size chamber through said fluid conduit into the fluid cartridge.

35. (previously presented) A system according to claim 34 and further including:

a one-way valve in said fluid transfer channel for enabling the flow of fluid from the container and for preventing the flow of fluid back to the container from said variable size chamber through said fluid transfer channel.

36. (currently amended) A system according to claim 34 and further including:

a one-way valve in said fluid conduit for enabling the flow of fluid from said variable size chamber into the fluid cartridge and for preventing the flow of fluid through said fluid conduit from the fluid cartridge into said variable size chamber.

37. (currently amended) A system according to claim 23 wherein the fluid cartridges to be filled include an entrance having an inside surface and side walls and a bottom device, the bottom device having an inside surface and an exterior surface, the bottom device engaging the inside surface and being movable between an unfilled position near the entrance to the fluid cartridge and a bottom position, the bottom device assuming the bottommost position when the fluid cartridge is filled with fluid, and wherein said fluid cartridge holding structure includes a support for engaging the exterior surface of the bottom device of a fluid cartridge held by said fluid cartridge holding structure.

38. (withdrawn-currently amended) A system according to claim 24 wherein said variable size chamber is a variable size air chamber, wherein said system further includes a stationary device stationary with respect to said container holding wall structure and having air chamber surfaces for defining a second portion of said variable size air chamber, and wherein said container holder wall structure further comprises:

first fluid chamber surfaces for defining one portion of a fluid chamber for receiving fluid from the containers; and

a door structure for defining a second portion of said fluid chamber, said door structure having a closed condition for cooperating with said first fluid chamber surfaces to form said fluid chamber, and an open condition for discharging fluid from said fluid chamber, said door structure assuming the open condition when a fluid cartridge is received by said interface device;

said holder and said container holder wall structure being movable in response to force applied to said holder for forcing air from said variable size air chamber into the container held by said holder, and for forcing fluid from said fluid chamber.

39. (withdrawn) A system according to claim 38 and further including:

biasing structure for biasing said holder and said container holder wall structure from a decreased condition wherein said variable size air chamber is in the decreased size to an expanded condition wherein said variable size air chamber is in the expanded condition.

40. (withdrawn) A system according to claim 39 wherein said fluid chamber has a one-way valve for enabling fluid to enter said fluid chamber from the container and preventing fluid from flowing from said fluid chamber towards the container.

41. (withdrawn) A system according to claim 40 wherein said fluid chamber holds a metered amount of fluid.

42. (withdrawn) A system according to claim 38 wherein the container has a discharge orifice and a septum closing the orifice to hold fluid in the container, and said holder includes a piercing instrument for piercing the septum, and wherein said pressure differential apparatus comprises:

an air transfer channel for transferring pressurized air from said variable size air chamber into the container in response to said variable size air chamber assuming the decreased size; and

a fluid transfer channel for transferring fluid from the container to said fluid chamber in response to the transfer of pressurized air to the container.

43. (withdrawn) A system according to claim 42 wherein said instrument for piercing the septum is a spike, said fluid transfer channel extends through said spike interconnecting the container and said fluid chamber, and said air transfer channel extends through said spike interconnecting the container and said variable size air chamber.

44. (withdrawn) A system according to claim 43 wherein said fluid transfer channel has a one-way valve for enabling fluid to flow from a container into said fluid chamber and preventing the flow of fluid into the container, and said air transfer channel has a one-way valve for enabling air to be transferred into a container and for preventing air and fluid from leaving the container.

45. (previously presented) A system according to claim 24 wherein the collapsible container is a collapsible container containing fluid having a discharge opening for forcing the discharge of fluid from a discharge opening, wherein said interface has interface surfaces for defining a second portion of said variable size chamber,

said container holder wall structure and said interface device being movable in a first direction to expand the size of said variable chamber to establish a suction at the discharge end of the collapsible container and pull fluid from the collapsible container into said chamber.

46. (previously presented) A system according to claim 45 wherein the collapsible container is a syringe having a movable piston for forcing the discharge of fluid from a discharge opening, wherein said interface device has interface surfaces for defining a second portion of said variable size chamber,

said container holder wall structure and said interface device being movable in a first direction to expand the size of said variable chamber to establish a suction at the discharge end

of the syringe and pull fluid from the syringe into said chamber, the piston following the movement of fluid from the syringe.

47. (previously presented) A system according to claim 45 wherein said interface device comprises:

a receptacle for receiving said holder wall structure to define said variable size chamber;
and

a conduit for transferring fluid from said chamber to a cartridge.

48. (currently amended) A system according to claim 47 wherein said holder and said container holder wall structure are movable in response to force applied to said holder, said receptacle receiving said holder wall structure includes said interface device for receiving a fluid cartridge in position to receive fluid from said conduit.

49. (previously presented) A system according to claim 48 and further includes a biasing device for urging said container holder wall structure in the first direction to increase the size of said variable air chamber.

50. (currently amended) A system according to claim 48 wherein said fluid chamber is able to hold at least enough fluid to fill a fluid cartridge, and said fluid chamber discharging sufficient fluid to fill a fluid cartridge received in said interface device in response to the changing of said variable size air chamber from the expanded size to the decreased size.

51. (previously presented) A system according to claim 46 and further including:

a fluid transfer channel for receiving fluid from the syringe; and

a one-way valve in said fluid transfer channel for enabling the flow of fluid from the syringe and for preventing the flow of fluid from said fluid chamber through said fluid transfer channel.

52. (withdrawn-currently amended) A system according to claim 24 wherein the container is a syringe having a movable piston for forcing the discharge of fluid from a discharge end of the syringe, and wherein said variable size chamber is a variable size air chamber, wherein said system further includes a stationary device stationary with respect to said container holder wall structure and having said interface device, and wherein container holder wall structure further comprises:

first fluid chamber surfaces for defining one portion of a fluid chamber for receiving fluid from the syringe; and

a door structure for defining a second portion of said fluid chamber, said door structure having a closed condition for cooperating with first fluid chamber surfaces to form said fluid chamber, and an open condition for discharging fluid from said fluid chamber, said door structure assuming the open condition when a cartridge is received by said interface device;

said holder and said container holder wall structure being movable in response to force applied to said holder for forcing air from said variable size air chamber into the syringe held by said holder, and for discharging fluid from said fluid chamber into a fluid cartridge.

53. (previously presented) A system according to claim 52 and further including:

biasing structure for biasing said holder and said container holder wall structure from a decreased condition wherein said variable size air chamber is in the decreased size to an expanded condition wherein said variable size chamber is in the expanded size.

54. (previously presented) A system according to claim 53 wherein said fluid chamber has a one-way valve for enabling fluid to enter said fluid chamber for the container and preventing fluid from flowing from said fluid chamber towards the syringe.

55. (previously presented) A system according to claim 54 wherein said fluid chamber holds a metered amount of fluid.

* * *